

**IN THE CLAIMS:**

Please cancel claims 1, 2, 20-22, 27-29, 37-38, and 40 without prejudice or disclaimer as to the subject matter thereof.

1.-2. (canceled)

3. (currently amended) ~~A method according to claim 2, A method for one of delivering and withholding delivery of an extra-systolic stimulation cardiac pacing therapy, comprising:~~

~~sensing electrical activity of a heart to provide a heart rate signal for said heart;~~

~~correlating the heart rate signal and an extra-systolic interval for an extra-systolic stimulation therapy to a data set having at least a plurality of heart rates and a plurality of extra-systolic intervals; and~~

~~based on the correlation either delivering or inhibiting delivery of the extra-systolic stimulation therapy.~~

~~wherein the data set includes empiric heart rate-based guidance for refractory period changes of a chamber of the heart for a plurality of heart rates, and~~

~~wherein the data set includes evoked response information, and wherein said information is derived from measurements of an evoked response from the extra-systolic stimulation therapy, said information establishing, for at least one cardiac cycle, a refractory period of the chamber of the heart.~~

4. (original) A method according to claim 3, wherein said information comprises at least one of: an evoked R-wave response, an evoked R-wave timing parameter, an evoked R-wave morphology characteristic, an evoked P-wave response, an evoked P-wave timing parameter, an evoked P-wave morphology characteristic, an evoked T-wave response, an evoked T-wave timing parameter, an evoked T-wave morphology characteristic, a ventricular pressure signal, an atrial pressure signal, a change of magnitude of a maximum

derivative of the ventricular pressure signal, a change of magnitude of a maximum derivative of the atrial pressure signal.

5. (currently amended) A method according to claim 34, wherein at least some of said plurality of correlated heart rates and extra-systolic intervals incorporate reduced extra-systolic intervals for a set of relatively higher heart rates.

6. (currently amended) A method according to claim 34, wherein at least some of said plurality of correlated heart rates and extra-systolic intervals incorporate increased extra-systolic intervals for a set of relatively lower heart rates.

7. (original) A method according to claim 5, wherein said correlated heart rates and extra-systolic intervals incorporate a security-timing margin for a tachycardia induction portion of the data set.

8. (currently amended) A method according to claim 34, wherein the data sets incorporate information regarding a predicted degree or a measured degree of a stroke volume augmentation resulting from at least some discrete combinations of the correlated data sets.

9. (currently amended) A method according to claim 34, wherein at least some of the correlated data sets incorporate information regarding enhanced arrhythmia detection.

10. (original) A method according to claim 9, wherein for at least some of the correlated data sets that include potential for a masked tachycardia rhythm, further comprising:

periodically withholding delivery of the extra-systolic stimulation therapy or decreasing the extra-systolic interval.

11. (original) A method according to claim 9, further comprising:  
intermittently withholding delivery of the extra-systolic stimulation therapy for at least one cardiac cycle for every N cardiac cycles to expose a masked tachycardia rhythms, wherein N comprises a non-zero integer.

12. (original) A method according to claim 9, wherein the information regarding enhanced arrhythmia detection includes a reduced electrogram blanking period following delivery of a cardiac pacing stimulation pulse or an extra-systolic stimulation pulse.

13. (original) A method according to claim 12, wherein the reduced electrogram blanking period includes a cross-chamber blanking period and a same-chamber blanking period.

14. (currently amended) A method according to claim 12, wherein the reduced blanking extends at least one arrhythmia sensing interval for at least a portion of relatively higher heart rates mapped to ~~the a~~ table.

15. (currently amended) A method according to claim ~~34~~, wherein at least a portion of the correlated data sets incorporate information regarding a diastolic compromise condition.

16. (currently amended) A method according to claim ~~34~~, wherein for a plurality of relatively low heart rates: delivering the extra-systolic stimulation therapy for every cardiac cycle; and for a plurality of relatively high heart rates: withholding delivery of the extra-systolic stimulation therapy.

17. (original) A method according to claim 16, further comprising:  
applying an alternate paced heart rate during delivery of the extra-systolic stimulation therapy wherein the correlated data sets are disposed in, or proximate to, a region of a possibly masked tachycardia rhythm;

comparing the alternate paced heart rate to the correlated heart rate to determine if the alternate paced heart rate is about double or about half of the mapped heart rate; and  
in the event that the alternate paced heart rate is about double or one-half of the mapped heart rate, withholding delivery of the extra-systolic stimulation therapy.

18. (original) A method according to claim 17, further comprising:  
applying an arrhythmia detection technique; and  
in the event that an arrhythmia is detected, attempting to terminate the arrhythmia.
19. (original) A method according to claim 18, wherein attempting to terminate the arrhythmia comprises at least a one of: providing an anti-tachycardia pacing therapy, providing a cardioversion therapy, providing a defibrillation therapy, providing a burst-type pacing therapy, providing a ramp-type pacing therapy.
- 20.-22. (canceled)
23. (currently amended) A method according to claim 2522, wherein the table includes empiric heart rate-based rules for refractory period changes of a chamber of the heart for a plurality of heart rates.
24. (canceled)
25. (currently amended) A method according to claim 24. A method for initiating or gradually suspending delivery of an extra-systolic stimulation cardiac pacing therapy, comprising:  
sensing electrical activity of a heart to provide a heart rate signal for said heart;

correlating the heart rate signal and an extra-systolic interval for an extra-systolic stimulation therapy to a therapy initiation-and-suspension table containing at least a plurality of heart rates and a plurality of extra-systolic intervals; and

based on the mapped location of the heart rate signal on the table and the mapped extra-systolic interval either delivering, or inhibiting delivery of, the extra extra-systolic stimulation therapy, wherein the therapy initiation-and-suspension table includes a plurality of therapy transition rules,

wherein one therapy transition rule provides a series of relatively long extra-systolic intervals compared to a cardiac cycle interval for a short period of time following initial delivery of the extra-systolic stimulation therapy and wherein said intervals are progressively shortened as the heart rate decreases during delivery of the extra-systolic stimulation therapy, or

wherein delivery of the extra-systolic stimulation therapy may not be suspended immediately in the event that the heart rate exceeds a pre-established heart rate limit, wherein the table includes evoked response information, said information derived from measurements of an evoked response from the extra-systolic stimulation therapy, said information establishing, for at least one cardiac cycle, a refractory period of the chamber of the heart, and

wherein said information comprises at least a one of: an evoked R-wave response, an evoked R-wave timing parameter, an evoked R-wave morphology characteristic, an evoked P-wave response, an evoked P-wave timing parameter, an evoked P-wave morphology characteristic, an evoked T-wave response, an evoked T-wave timing parameter, an evoked T-wave morphology characteristic, a ventricular pressure signal, an atrial pressure signal, a change of magnitude of a maximum derivative of the ventricular pressure signal, a change of magnitude of a maximum derivative of the atrial pressure signal.

2625. (currently amended) A method according to claim 25, wherein in the event that the heart comprises a part of a chronotropically incompetent hemodynamic system and further comprising:

reducing a rate responsiveness characteristic relative to a detected patient activity signal, so that the resulting rate response slope for a chronotropically incompetent hemodynamic system reflects a wider range of enhanced hemodynamic function over a wider range of heart rates.

27.-29. (canceled)

3029. (currently amended) A medium according to claim 28, A computer readable medium for causing a programmable processor to perform a method of delivering or withholding delivery of an extra-systolic stimulation therapy, comprising:

instructions for sensing electrical activity of a heart to provide a heart rate signal for said heart;

instructions for mapping the heart rate signal and an extra-systolic interval for an extra-systolic stimulation therapy to a table containing at least a plurality of heart rates and a plurality of extra-systolic intervals; and

based on the location on the table of the mapped heart rate signal and the mapped extra-systolic interval either instructions for delivering, or inhibiting delivery of, the extra extra-systolic stimulation therapy,

wherein the table includes evoked response information, said information derived from measurements of an evoked response from the extra-systolic stimulation therapy, said information establishing, for at least one cardiac cycle, a refractory period of the chamber of the heart,

wherein the table includes empiric heart rate-based rules for refractory period changes of a chamber of the heart for a plurality of heart rates, and

wherein said information comprises at least a one of: an evoked R-wave response, an evoked R-wave timing parameter, an evoked R-wave morphology

characteristic, an evoked P-wave response, an evoked P-wave timing parameter, an evoked P-wave morphology characteristic, an evoked T-wave response, an evoked T-wave timing parameter, an evoked T-wave morphology characteristic, a ventricular pressure signal, an atrial pressure signal, a change of magnitude of a maximum derivative of the ventricular pressure signal, a change of magnitude of a maximum derivative of the atrial pressure signal.

3130. (currently amended) A medium according to claim 3026, wherein at least some of said plurality of mapped heart rates and extra-systolic intervals incorporate reduced extra-systolic intervals in the event that the heart rate increases.

3234. (currently amended) A medium according to claim 3026, wherein at least some of said plurality of mapped heart rates and extra-systolic intervals incorporate increased extra-systolic intervals in the event that the heart rate decreases.

3332. (currently amended) A medium according to claim 3130, wherein said mapped heart rates and extra-systolic intervals incorporate a security-timing margin for a tachycardia induction portion of the table.

3439. (currently amended) A medium according to claim 3026, wherein at least a portion of the mapped location of the table incorporates information regarding a predicted degree or a measured degree of a stroke volume augmentation resulting from the extra-systolic stimulation therapy.

3534. (currently amended) A medium according to claim 3026, wherein at least a portion of the mapped locations of the table incorporates information regarding enhanced arrhythmia detection.

3635. (currently amended) A medium according to claim 3534, wherein in the event that the portion of the mapped locations of the table include potential for a

masked tachycardia rhythm, comprising executing either instructions for periodically withholding delivery of the extra-systolic stimulation therapy or instructions for decreasing the extra-systolic interval.

37-38. (canceled)

3937. (currently amended) A system according to claim 3938, wherein the data set includes empiric heart rate-based guidance for refractory period changes of a chamber of the heart for a plurality of heart rates.

40. (canceled)

4139. (currently amended) A system according to claim 38. A system for delivering or withholding delivery of an extra-systolic stimulation cardiac pacing therapy, comprising:

means for sensing electrical activity of a heart to provide a heart rate signal for said heart;

means for correlating the heart rate signal and an extra-systolic interval for an extra-systolic stimulation therapy to a data set having at least a plurality of heart rates and a plurality of extra-systolic intervals; and based on the correlation either delivering or inhibiting delivery of the extra extra-systolic stimulation therapy,

wherein the data set includes evoked response information, said information derived from measurements of an evoked response from the extra-systolic stimulation therapy, said information establishing, for at least one cardiac cycle, a refractory period of the chamber of the heart, and

wherein said information comprises at least one of: an evoked R-wave response, an evoked R-wave timing parameter, an evoked R-wave morphology characteristic, an evoked P-wave response, an evoked P-wave timing parameter, an evoked P-wave morphology characteristic, an evoked T-wave response, an evoked T-wave timing parameter, an evoked T-wave morphology characteristic, a ventricular pressure signal, an atrial pressure signal, a change of magnitude of



a maximum derivative of the ventricular pressure signal, a change of magnitude of a maximum derivative of the atrial pressure signal.

4240. (currently amended) A system according to claim 4137, wherein at least some of said plurality of correlated heart rates and extra-systolic intervals incorporate reduced extra-systolic intervals for a set of relatively higher heart rates.

4344. (currently amended) A system according to claim 4137, wherein at least some of said plurality of correlated heart rates and extra-systolic intervals incorporate increased extra-systolic intervals for a set of relatively lower heart rates.

4442. (currently amended) A system according to claim 41, wherein said correlated heart rates and extra-systolic intervals incorporate a security-timing margin for a tachycardia induction portion of the data set.

4543. (currently amended) A system according to claim 4137, wherein the data sets incorporate information regarding a predicted degree or a measured degree of a stroke volume augmentation resulting from at least some discrete combinations of the correlated data sets.

4644. (currently amended) A system according to claim 4137, wherein at least some of the correlated data sets incorporate information regarding enhanced arrhythmia detection.

4745. (currently amended) A system according to claim 4644, wherein for at least some of the correlated data sets that include potential for a masked tachycardia rhythm, further comprising:

means for periodically withholding delivery of the extra-systolic stimulation therapy or decreasing the extra-systolic interval.

4846. (currently amended) A system according to claim 4644, further comprising:

means for intermittently withholding delivery of the extra-systolic stimulation therapy for at least one cardiac cycle for every N cardiac cycles to expose a masked tachycardia rhythms, wherein N comprises a non-zero integer.

4945. (currently amended) A system according to claim 4644, wherein the information regarding enhanced arrhythmia detection includes a reduced electrogram blanking period following delivery of a cardiac pacing stimulation pulse or an extra-systolic stimulation pulse.

5046. (currently amended) A system according to claim 4945, wherein the reduced electrogram blanking period includes a cross-chamber blanking period and a same-chamber blanking period.

5147. (currently amended) A system according to claim 4945, wherein the reduced blanking extends at least one arrhythmia sensing interval for at least a portion of relatively higher heart rates mapped to the table.

5248. (currently amended) A system according to claim 4137, wherein at least a portion of the correlated data sets incorporate information regarding a diastolic compromise condition.

5349. (currently amended) A system according to claim 4137, further comprising: for a plurality of relatively low heart rates, means for delivering the extra-systolic stimulation therapy for every cardiac cycle; and for a plurality of relatively high heart rates, means for withholding delivery of the extra-systolic stimulation therapy.

5450. (currently amended) A system according to claim 5349, further comprising:

means for applying an alternate paced heart rate during delivery of the extra-systolic stimulation therapy wherein the correlated data sets are disposed in, or proximate to, a region of a possibly masked tachycardia rhythm;

means for comparing the alternate paced heart rate to the correlated heart rate to determine if the alternate paced heart rate is about double or about half of the mapped heart rate; and

in the event that the alternate paced heart rate is about double or one-half of the mapped heart rate, means for withholding delivery of the extra-systolic stimulation therapy.

5554. (currently amended) A system according to claim 5450, further comprising:

means for applying an arrhythmia detection technique; and

in the event that an arrhythmia is detected, means for attempting to terminate the arrhythmia.

5652. (currently amended) A method according to claim 5554, wherein the means for attempting to terminate the arrhythmia comprises at least a one of: means for providing an anti-tachycardia pacing therapy, means for providing a cardioversion therapy, means for providing a defibrillation therapy, means for providing a burst-type pacing therapy, means for providing a ramp-type pacing therapy.